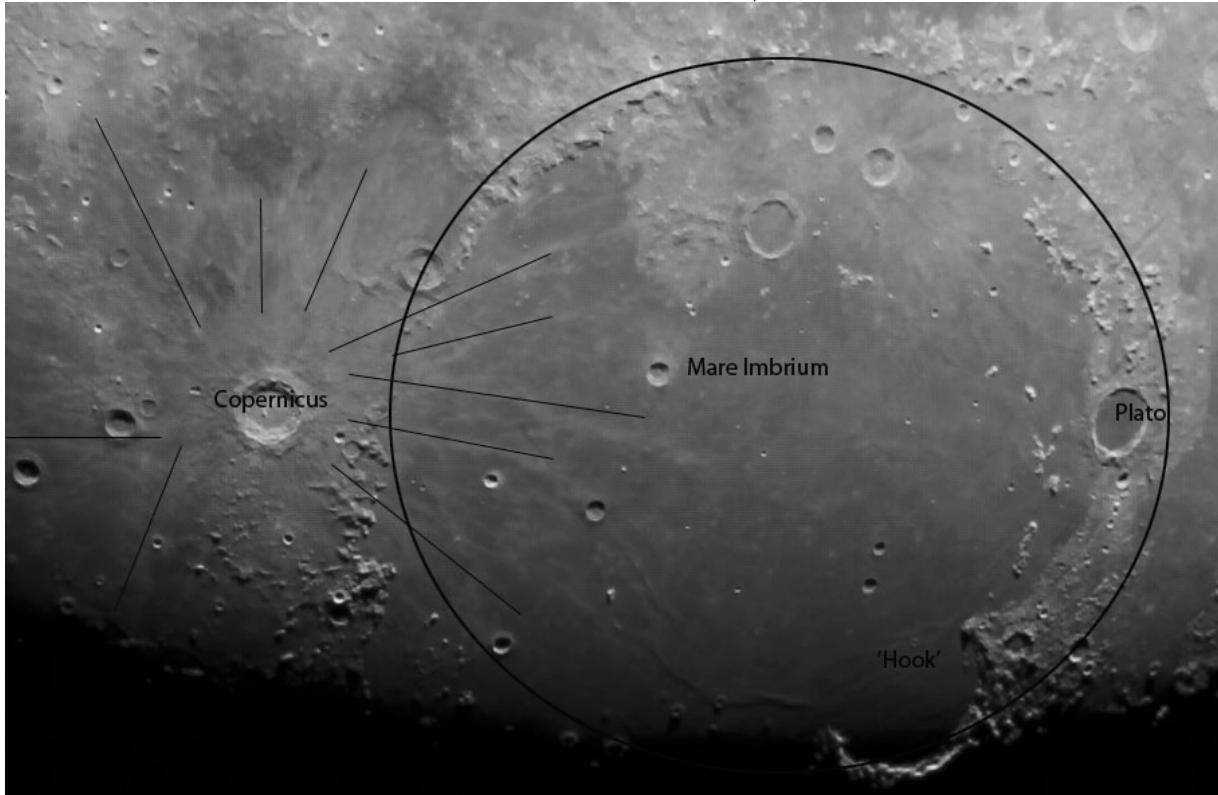


Sky WAM tch



Sea of Rains

Rick Bria took this picture of the Moon on May 12th at the Mary Aloysia Hardey Observatory. Explains Rick: Just right of center is Mare Imbrium, Latin for "Sea of Rains". It's a 1200 kilometer wide circular smooth area created by a large impact 4 billion years ago. The impact formed 7km high mountains chains that encircle Mare Imbrium. Lava then filled the crater giving it a smooth look.

The crater Plato is also lava filled and very smooth. Formed by an impact just after the formation of Mare Imbrium, Plato is 100 kilometers across.

Copernicus is an impact crater 93 kilometers in diameter and 4 kilometers deep. At only 800 million years old, Copernicus is much younger than Plato. As a result, its shape is noticeably more sharp and detailed. Copernicus has a rather obvious ray system formed by ejected material blasted out by the impact. This ray system is most obvious at full Moon, but can be seen in the attached picture taken just after first quarter phase.

Events for June 2011

WAA Lectures

"Exploring Exotic Matter of the Universe"

Friday June 3rd, 7:30pm

Miller Lecture Hall, Pace University

Pleasantville, NY

Deirdre Frost will speak on the search for unusual types of matter in the universe. Ms. Frost teaches at Sacred Heart University and also participates in the Educational Leadership Program at the University of Bridgeport in Connecticut. She is involved in writing and research on the latest scientific work at Brookhaven National Laboratory. Her current research includes the Relativistic Heavy Ion Collider (RHIC), the Large Hadron Collider (LHC), and the study of the Atmosphere and the Ocean. Free and open to the public. [Directions](#) and [Map](#).

Upcoming Lectures

Miller Lecture Hall, Pace University

Pleasantville, NY

There will be no Lectures in July and August. Lectures will resume in September.

Starway to Heaven

Saturday June 4th, 9:00pm

Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

This is our scheduled Starway to Heaven observing date for June, weather permitting. Free and open to the public. The scheduled rain/cloud date is June 25th. Participants and guests should read our [General Observing Guidelines](#) and [Directions](#).

Renewing Members . . .

Ruth and Eugene Fischer - Pleasantville

Gary Miller - Pleasantville

Bill Caspe - Scarsdale

James Peale - Bronxville

Rob Baker - West Harrison

WAA Club Picnic

Saturday June 18th, 2pm

Trailside Museum, Ward Pound Ridge

The event is for WAA members and their guests only. Club members are encouraged to bring side-dishes, salads and desserts. Tell the guard at gatehouse you are going to WAA Picnic. Rain-date: June 25th. [Directions](#).

Call: 1-877-456-5778 (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website at:

<http://www.westchesterastronomers.org/>.

WANTED Co-editor: Individual to help edit the WAA newsletter. Initial responsibilities to be proof-reading, but eventually seeking someone to co-edit newsletter. Knowledge of Apple Pages would be helpful. Contact: [Newsletter](#).



The Last Launch of Space Shuttle Endeavour

Credit: NASA

see:<http://apod.nasa.gov/apod/ap110518.html>

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is \$25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Doug Baum; Senior Vice President: Larry Faltz; Vice President Public Relations: David Parmet; Vice President Educational Programs: Pat Mahon; Treasurer: Rob Baker; Secretary/Vice President Membership: Paul Alimena; Vice President Field Events: Bob Kelly; Newsletter: Tom Boustead.

Articles and Photos

An Astronomy Vacation in Arizona: Part I: Flagstaff by Larry Fultz

Elyse and I had long been planning to visit my cousin Aryeh, recently retired as Professor of Linguistics at Arizona State University in Tempe. The usual life intrusions kept us from seeing him and his wife since our last visit in 2007, but it looked like we could make time this year for a swing out west.

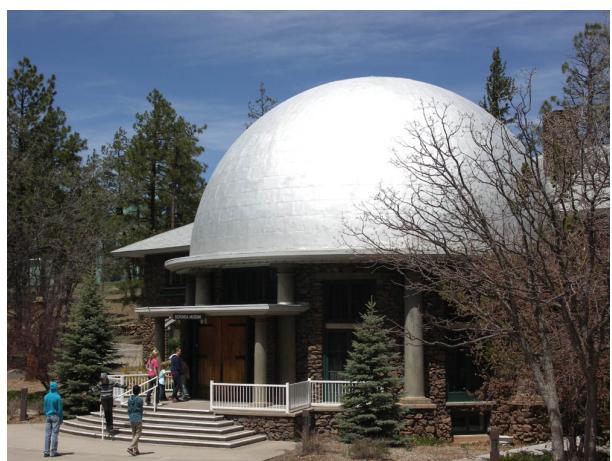
In February, I got an email from Rusty Tweed, the Development Manager at Lowell Observatory in Flagstaff. Lowell makes itself available (for a fee) to astronomy clubs, allowing all-night use of the 24-inch f/15 Alvan Clark refractor (1896) made famous by Percival Lowell when he glimpsed "canals" on Mars, as well as providing tours of Lowell's research facilities. I figured I'd look into that for WAA. Around the same time, Elyse found a Smithsonian Journeys trip to the big telescopes in the Tucson area, scheduled for the end of April. And at NEAF in mid-April I spent some time talking with Rikki Hocking of Lunt Solar Systems, who invited us to stop by the Lunt factory if we came to Tucson.

So we put a 12-day trip together, and April 20, 2011 found us heading north from Sky Harbor Airport in Phoenix to Flagstaff on I-17, a 2-hour drive through a variety of vast and impressive landscapes. Flagstaff, a town of 60,000, is home to Northern Arizona University and it's the gateway to the Grand Canyon, 2 more hours' drive to the northwest. At 7,000 feet elevation, skies are clear and steady. Transparency is helped by virtue of the first lighting ordinance in the United States, passed in 1958. Lowell Observatory is on Mars Hill, just a mile up a small hill from the "historic" downtown and on a line with US Route 66, yet the night sky read 20.45 on my Unihedron Sky Quality Meter.



White dome of the 24" Clark refractor from downtown Flagstaff

The Observatory is a center for astronomy history, public education and outreach, but it's also dedicated to active observational research, operating telescopes in Flagstaff, at a very dark site just outside of town and in Chile and Australia. A new 4.3-meter reflector is being built, with support from the Discovery Channel, at another dark site 40 miles from Flagstaff near the charmingly named town of Happy Jack.



Slipher Rotunda Museum at Lowell Observatory

We spent two evenings and one morning at Lowell. We attended an informative lecture in the visitor's center auditorium on meteors (with over 200 people

in attendance) and a very well-done general astronomy talk in the Slipher Rotunda Museum utilizing a unique, high-tech “portable planetarium” that Lowell’s staff sets up at schools and Indian reservations. The visitor’s center has well-crafted exhibits about astronomy, physics and Lowell history.

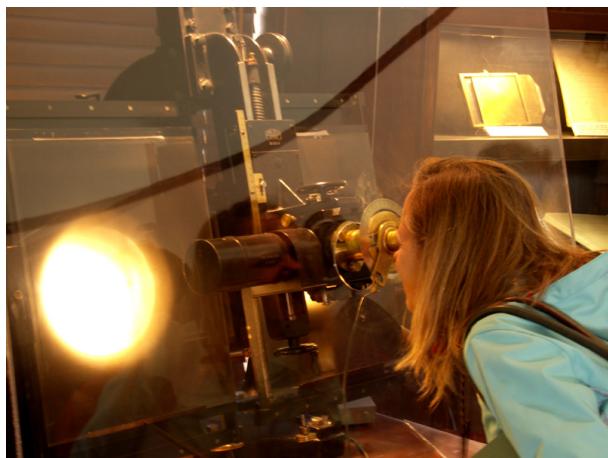
A very informative tour of the grounds introduced us to the instruments on Mars Hill, including Clyde Tombaugh’s Pluto discovery telescope, whose structure and use was well described by a volunteer docent. The museum displayed the fabled blink comparator at which Tombaugh so painstakingly labored in his quest for Planet X. As the docent reminded us, he also had to manually guide the astrograph, night after night, to make the photographic plates. There was no autoguiding in 1930!



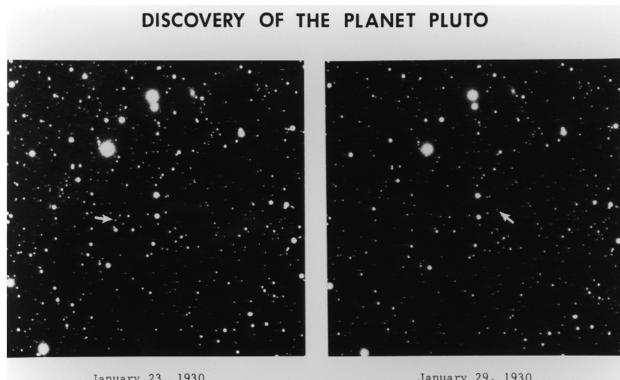
At the Pluto Discovery Telescope, a 13" refractor astrograph

On the two nights we were at Lowell (public viewing occurs most nights during the year) we viewed Saturn through the Clark refractor and looked at M51 through a 16" Dobsonian. For us dark-sky-starved New Yorkers, the Flagstaff night sky was lovely enough just to behold with the naked eye, and we spent plenty of time looking since the line to the Clark was quite long after the well-attended meteor lecture. In fact, we waited an hour and a quarter for

our 30-second glimpse of Saturn through the historic scope. It was well worth the wait: a steady, sharp, detailed view, the Cassini division very clear and at least 5 moons were visible.



Elyse at Tombaugh’s blink comparator in the Slipher Museum



We also spent an hour with Rusty Tweed (who proudly works in Tombaugh’s former office) learning about the mission, organization and goals of the Observatory and its plans for the future. Lowell has made a major investment in the \$44 million Discovery Channel Telescope project, committing a substantial amount of its own resources and fund-raising energies. A major outreach goal is to capture more of the tourists who stay briefly in Flagstaff on their way to the Grand Canyon (each year 2.3 million people stay at least one night in Flagstaff; Lowell gets about 80,000 visitors) by enhancing the range of activities during evening viewing sessions.

The discovery of Pluto and Vesto Slipher’s seminal determination in 1912 of the recession velocity of M31, which set the stage for Hubble’s discoveries 15 years later, are Lowell Observatory’s proudest scientific contributions (Slipher’s spectrograph is on display in the Museum). Percival Lowell’s confabulation of Martian canals is a mild but charming embarrassment, but he is appropriately

revered for his vision in setting up the observatory and his encouragement of observational research. Lowell himself is buried in a dome-shaped mausoleum a few yards from the 24 inch and a Lowell descendant is still the single Trustee of the organization, as Lowell specified in his will. Robert Burnham, Jr., author of the three-volume *Burnham's Celestial Handbook*, a classic reference for observational astronomers for nearly half a century, was a Lowell staff member. The official organizational take on the demotion of Pluto is diplomatic, basically "We discovered it, we named it, and that's enough for us." Lots of Pluto paraphernalia is available in the gift shop, all celebrating the discovery with nothing criticizing the demotion, but there was one creative swipe at the IAU's 2006 decision in a clever fund-raising gambit.



How would you vote?

At dinner in town one evening I was unable to resist listening to snippets of a conversation between two astronomers seated behind me: "...second order aberrations...high quantum efficiency...power supply...focus of the Kepler telescope...." That's not the kind of chat you get to eavesdrop on in New York. It was, as you might imagine, a real treat for a gearhead like me. But even without that bon-bon, Lowell is a very cool place. It represents the best of astronomy's past, present and future. You can learn more about it at www.lowell.edu.

One night around 9 pm we drove 10 miles outside of Flagstaff for some binocular viewing. (This site is

close to Lowell's Anderson Mesa research facility). The SQM reported a very dark 21.45. M42 was brilliant in 10x50 binoculars as it set on the western horizon and we had no trouble picking out M81 and M82 in the same field, M51, M63, M3 and the Beehive (M44). A few Lyrid meteors enhanced the evening's viewing, but again, the amazingly dark and transparent night sky was the real treat.



Sedona

We also spent most of one day in Sedona, an hour's drive south of Flagstaff, taking the route through atmospheric Oak Creek Canyon, which opens up to vast red rock formations and spectacular vistas beloved by the New Age "vortex" set. We stopped by Ye Olde UFO Store but alas, they were closed (abducted, perhaps?). Sedona is a center for art and Hopi and Navaho crafts, and Elyse found a wonderful Hopi silver pendant with symbols of the cloud and lightning gods. The sky has always really mattered out here.



Ye Olde UFO Store, Sedona



Dome of 24" Clark refractor at Lowell. Percival Lowell's mausoleum is behind the trees on the right.

We also visited Meteor Crater, just 43 miles east of Flagstaff on I-40. It's the best preserved impact crater on our planet, formed by a 150-foot iron meteor that slammed into the earth at over 25,000 miles per hour about 50,000 years ago. The crater is owned by the Barringer family, who a few years ago constructed a multi-level visitors' center with an excellent museum, a large auditorium (a docent gave an informative talk on the history and science of the crater) and a gift shop. The vibe of the whole place, though, projects a serious commitment to education and the scientific understanding of meteors.

On Saturday, April 23rd, we left Flagstaff and drove to Tempe to visit my cousin for a few days, but there could be no astronomy in the horribly light-polluted Phoenix area (the SQM reading at our hotel, the very nice Marriott Buttes in Tempe, was a dreadful

17.56). On our way out of town, we stopped at the Arizona State University Center for Meteorite Studies on the ASU campus, where the Meteorite Men bring their finds for analysis. A one-room museum displays a variety of whole and cut meteorites and provides detailed information about their structure and origin. The main part of the collection, the largest and probably most valuable in the world, is housed in an "undisclosed" location on the ASU campus that we couldn't get to see. Then we headed south for Tucson, where things *really* got interesting!



Meteorite display at Arizona State University

Stay tuned for Part II: A visit to Lunt Solar Systems, and Part III (and maybe IV): The Smithsonian tour to the big research telescopes outside of Tucson.





◀Vehicle Assembly Building

Dave Parmet took this image of the Vehicle Assembly Building during a recent Florida trip. The VAB is one of the largest buildings in the world. It was originally built for assembly of Apollo/Saturn vehicles and was later modified to support Space Shuttle operations.

Observing Report: Starway to Heaven, Ward Pound Ridge, May 7th by Bob Kelly and Dave Butler

A case of dueling forecasts confronted the May Starway to Heaven--60% clouds predicted the National Weather Service while the Clear Sky Chart said 10% or less clouds, with those few clouds mostly disappearing after sunset. Fortunately, Bob Kelly went with the Clear Sky Clock, refused to cancel the event, and a fine night of viewing resulted.

Seeing and transparency only got better as the evening progressed, with 5 or 6 of Saturn's moons, shadow of the rings on the planet, a light brown belt, and maybe Cassini's Division visible in Bob's 8-inch dob. The Moon fascinated our guests, with the bright earthshine ghost-like in the Dave Butler's telescope. Observers liked the crater with the central peak's shadow crossing its crater wall, like a lunar sundial. But they kept coming back for Saturn, to the point that even when Bob was packing up hours later, someone came again to see Saturn. The brightness of the view in the larger scope really helped. Some guests even learned to nudge the scope to keep Saturn in view at 200x.

With checking on our guest observers, including someone who valiantly labored to get an Orion go-to to 'go-to' anything, Bob didn't get to the fainter stuff. He talked about Alcor/Mizar and oriented a few newcomers to the sky (often with Charlie Gibson pointing out the features from behind him).

Dave in his 8-inch Cassegrain had Saturn at 250x, with 5 moons, the upper brown belt and the Cassini's division on both sides. Tom Boustead also saw the

division on his push-to 4-inch refractor but it didn't stay in the eyepiece long at 200x.

Next to Dave was an excellent 12.5 inch dob that tracked. Its images were extremely good and drew a good gathering. The Sombrero Galaxy looked like a long bright spiral Galaxy with a noticeable dust lane and slight tilted. Dave made it slightly out of focus which brightened the galaxy and made the details more apparent. Dave also noted the background stars surrounding the Sombrero. The Bode Galaxy, when centered showed a touch of spiral structure. M82 was full of details as usual. M51 was also viewed, but any structure was hard to pick up. Globular clusters M3, M13 and M92 were popular. The Ring Nebula was a late object; a slightly elongated bright ring with a hole in it.

Tom showed the lovely Blue Orange double top star in Cancer (iota Cancer). Tom's push-to 4-inch refractor was a delight to move and worked very well. Tom also showed the Butterfly open cluster. It was about 25 degrees away from the Moon so it wasn't as bright as normal. When we left around 11pm there were still plenty of viewing going on.

Thanks to everyone for coming and making it a great evening!!!

Almanac

For June 2011 by Bob Kelly

To paraphrase a cliché, is the astronomical view always better on the other side of the world? The next 31 days feature two solar eclipses and one lunar eclipse, not visible from most of the continental USA. The lunar eclipse we won't see is only seven minutes short of the longest possible duration, but the solar eclipses are partial and visible only from far northern or southern locations. So what did the summer solstice gods leave for us? Short nights and extended twilights are the rule for June. The solstice occurs at 1:17pm on the 21st, but the latest sunset of the year is on the 28th, at about 8:31pm, so astronomical twilight can start as late as 9:40, cutting deeply into Prime Time deep sky watching. But lengthy twilights have a beauty of their own, plus there is still much to see in the twilight skies.

Saturn is in a prime location, halfway up in the south as darkness falls. The +0.8 magnitude planet moves up to and stops just short of γ Virginis (a.k.a. Porrima, mag. +2.7). Tracking Saturn with a bright star nearby is fun for even the most casual observer with only the unaided eye as equipment. Cranking up the power on your telescope, with Porrima in the same view, you may be able to see that Porrima is a tightly spaced double star. Saturn's rings are wonderful in a telescope, as always, despite being tilted only 7 degrees from edge-on, the thinnest the rings will look the rest of this year. Iapetus is the third largest moon of Saturn, dark on one side and bright on the other. Its brighter side faces us in June, on the west side of Saturn, making it easier to see (10th mag). It's hard to find sites that plot the position of Iapetus, since its orbit is wider and tilted more than the other bright moons. But that means the other moons mostly see Saturn's rings edge-on and a visitor to Iapetus can see the rings opened up. So Iapetus is the moon you want to visit for a rings-side seat!

The Moon starts out the month getting kicked out of the twilight by the legs of the Gemini on June 3rd and 4th when the twins are standing up straight from the horizon. The bright, thin crescent contrasts with ghostly earthshine on the Moon. Luna soars above the western horizon early in the month, but never gets more than halfway up in the sky during typical viewing hours in June.

Jupiter breaks out of the tight gathering of planets in the morning sky, as if coming out to tattle on the other planets' shenanigans low in the bright dawn sky. By the end of the month, Jupiter (mag. -2.1) is well above



the morning horizon. But viewing its cloud bands during twilight can be easier due to improved contrast. Meanwhile, Venus' elongation from the Sun decreases to less than 20 degrees, making daytime observations of the tiny disc difficult, even dangerous, so close to the Sun. (Venus is 95% illuminated, 10.3 arc second wide at mag. -3.8.) If you missed the Moon, Pleiades and Hyades photo op last month, you can try again as the Moon and Mars pose with the large clusters on the 28th and 29th. It will be harder to get a good shot as the bright morning twilight may overwhelm the dimmer members of the clusters. Mercury sneaks into the evening sky late in the month. The two bright stars nearby are Castor and Pollux, now struggling to keep their heads above the horizon. You can watch Mercury's superior conjunction with the Sun around June 12th via the Solar and Heliospheric Observatory's LASCO C3 camera on the SOHO web site.

Earth comes to opposition with everyone's favorite used-to-be-a-planet, Pluto, on the 28th. At 14th magnitude, even those with a 10 inch + telescope will have trouble picking this premiere member of the Kupier Belt out of the starry background in the southern reaches of the ecliptic in Sagittarius.

One advantage of long twilights is the large number of earth-orbiting objects that you can see every night. In mid-June, thirty or more satellites or rocket parts brighter than magnitude 3 ½ pass over us each evening. For example, in June, the high-inclination orbit of the International Space Station allows it to stay in sunshine for many passes in a row over some locations. On the night of the 15th – 16th, the ISS is forecast to be visible over our area every 95 minutes for six passes in a row. Other interesting objects include the Air Force space plane, X-37-B, making some 2nd magnitude passes over us during the evenings of the first week in June. The solar sail test satellite, Nano-Sail D, is fainter, but getting brighter as it loses altitude due to solar pressure and running into atoms in Earth's tenuous exosphere. Check our web site and spaceweather.com for links to info on when to see satellites.

For those who stay out after the twilight has dimmed and when the moon is set, the sky overhead this time of year is a wonderland of galaxies for the observer with a good map or guidebook. Bob has a blog at <http://bkellysky.wordpress.com/>.